REMARKS

Basis for the amendment to claim 1 may be found in original claim 21 and at page 7/ lines 26-31 and page 7/ lines 11-16. Basis for the amendment to claim 26 may be found on page 18/ lines 4-5.

Applicants hereby acknowledge the Examiner's telephone Interview Summary mailed August 27, 2004 and agree as to the content except that the interview was conducted on <u>May</u> 12, 2004 rather than <u>March</u> 22, 2004.

In the outstanding non-final Office Action, paragraph 2, claims 1-20, 22-31 and 35 stand rejected under 35 USC 103(a) as being unpatentable over Allen et al. ('961). The Examiner states that Allen et al. disclose a light diffuser comprising a polymeric film wherein the film comprises a plurality of layers having a void geometry with a circular cross section in a plane parallel to the direction of light traveling which the void frequency varies between at least two layers. This rejection is respectfully traversed.

The Examiner states that Allen et al. teaches a multilayer in which "the void frequency varies between at least two layers (the number of scatterers changes, therefore arranged in increasing or decreasing size and frequency of voids; column 22/ lines 50-51)". The applicants respectfully disagree with this interpretation of Allen et al. The section of the patent at col 22/ lines 50-51 of Allen et al states that "(that is, if the two sheets present a substantially equal and large number of scatterers to incident light along a given axis)". The quoted section describes more than one sheet (or layer) that have a substantially <u>equal</u> number of scatterers between the sheets or layers and does not teach a frequency variation between the two layers nor that the sheets are arranged in increasing or decreasing size or frequency. The result of having these two sheets (with the same number of scatterers) stated by Allen et al. Col 22/ lines 51-54, is high reflectivity compared to a single film, not an increase in light diffusion efficiency as in the Applicant's present invention. Further, Allen et al. states in col 22/ lines 54-57 that if the optical thicknesses of the phases within the sheets are not substantially equal (the thickness in the z direction of the phase), the composite will reflect across a broader band width than the individual phases. This teaches how two or more films, when combined, reflect light. Allen et al. is silent on the transmissive properties of multilayer combinations.

Allen et al does not teach microvoids having a substantially circular cross section in a plane perpendicular to the direction of the light travel. In this respect, the Examiner's attention is directed to col 2/ line 66 to col 3/ line 3 where the Allen et al. reference teaches away from the microvoids having a substantially circular cross section by stating that, "The polymers are selected such that there is low adhesion between the dispersed phase and the surrounding matrix polymer, so that an elliptical void is formed around each inclusion when the film is stretched."

The Examiner acknowledges that Allen et al. fail to disclose a film in which the frequency of voids varies by at least 28% between layers, a light transmission efficiency of greater than 80% at 500 nm, and a variation sufficient to increase the light transmission efficiency by at least 10% at 500nm compared to a single voided layer of the same thickness of the layers but with only one void frequency and void size. The Examiner states that Allen et al, disclose a film in which the frequency of voids varies between the layers and a film in which the volume fraction of voids is varied to obtain desired transmission properties for a given application at a given wavelength. Allen et al. does not disclose a film in which the frequency of voids varies between the layers. Allen et al. discusses differences in the optical thicknesses of the phases (the thickness of the void in the direction of light travel), col 22/ lines 48-57, between the two or more sheets and the resulting combination. Allen et al. is silent on a void frequency variation between two or more layers and furthermore has no teaching on the resulting transmission properties on combining two or more films or layers.

The Examiner suggests that the volume fraction of the disperse phase relates to the volume fraction of voids in the film assuming the disperse phase and the continuous phase materials are chosen so that the interface between the two phases are sufficiently weak to result in voiding when the film is oriented and that Allen et al. discloses how volume fraction of the disperse phase affects the reflection and transmission properties of the resulting film; however the Applicants respectfully disagree that volume fraction of the disperse phase is necessarily related to frequency. There are some instances that volume fraction may be related to frequency, but frequency is a measurement relating to the item quantitiy of something rather than the aggregate amount of space it takes up. For example, a film can have a set void volume fraction and have 2 large voids each

containing 50% of the total void volume or the film could have 100 small voids each containing 2% of the total void volume fraction. These two scenarios would have the same volume fraction but very different frequencies and different optical properties. Therefore, it is insufficient and incorrect to rely on void volume fraction as a means for specifying a frequency of voids. Allen et al. does not teach, disclose, nor suggest a frequency of voids that varies between 2 layers by at least 28%.

The Examiner concludes, wrongly we believe, that the transmission properties would be readily determined through routine optimization of the frequency of voids by one having ordinary skill in the art depending on the desired end use of the product. Applicants respectfully disagree. Allen et al. discloses the use of microvoids at col 22/ lines 4-14 stating that:

> "the materials of the continuous and disperse phases may be chosen so that the interface between the two phases will be sufficiently weak to result in voiding when the film is oriented. The average dimensions of the voids may be controlled through careful manipulation of processing parameters and stretch ratios, or through selective use of compatiblizers. The voids may be back-filled in the finished product with a liquid gas, or solid. Voiding may be used in conjunction with the aspect ratios and refractive indices of the disperse and continuous phases to produce desirable optical properties in the resulting film.

This statement supports the use of microvoids to control some optical properties of the resulting optical film, but does not enable one skilled in the art to practice using voids in the film to create Applicants' invention because optical properties of the voids were not taught, nor how to select values for the multiplicity of parameters (first polymer, second polymer, compatibilizer, disperse phase thickness, disperse phase size in x and y direction, aspect ratio of aspect ratio, thickness of film, number of layers, etc) to obtain the desired optical properties. One having ordinary skill in the art would have to perform undue and extensive experimentation in order to determine the proper parameters for the desired transmission and diffuse transmission efficiency because Allen et al. does not teach how the parameters affect the voiding and the optical performance of the resulting film.

The Examiner acknowledges that Allen et al. fail to disclose a diffuser having a diffuse light transmission efficiency improved by 10% and an

elastic modulus of greater than 500 millipascal, a diffuser having a diffuse light transmission efficiency of greater than 87%, the thermoplastic layers which contain greater than 4 index of refraction changes greater than 0.20 parallel to the direction of travel of light, voids having an average volume of between 8 and 42 cubic micrometers, and a thickness of less than 250 micrometers. However, the Examiner states that Allen et al. does teach a diffuser in which transmission efficiency is dependant on volume fraction, has a modulus of at least 1 millipascal, contains at least 1 index of refraction greater than 0.20 parallel to the direction of light travel, has voids with an average volume corresponding to one-thirtieth the wavelength of light and a thickness of 625 microns and a film in which the properties are varied to obtain desired transmission properties for a given application. The examiner states that it would have been obvious to one of ordinary skill in the art to vary elastic modulus, number of index of refraction changes, volume of voids, and thickness in order to obtain desired transmission properties. Applicants respectfully disagree with this conclusion.

The Examiner states that in col 12/ lines 60-67, Allen et al. teach a diffuser in which the transmission efficiency is dependant on volume fraction. Applicants have employed the term "diffuse light transmission efficiency". The term "diffuse light transmission efficiency" means the ratio of % diffuse transmitted light at 500 nm to % total transmitted light at 500 nm multiplied by a factor of 100.", (page 6/ lines 3-5 of the application). Transmission efficiency and diffuse light transmission efficiency are different measurements. Secondly, the Examiner has mistakenly concluded that the units of Applicants' claim limitation on elastic modulus of at least 500 MPa as millipascals when in fact MPa means megapascals. Please see page 13 of the enclosed reference, Elementary Principles of Chemical Processes by Felder and Rousseau, for unit prefixes. The examiner states that Allen et al. disclose and teach a modulus of at least 1 millipascal which is 10^9 (1,000,000,000) times smaller than the claimed range of greater than 500 MPa, and therefore Applicants respectfully disagree that Allen et al. would have taught the claimed range.
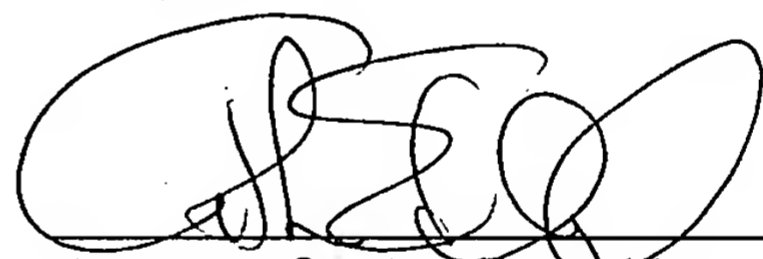
Applicants respectfully disagree with the Examiner's statement that the voids have an average volume corresponding to one-thirtieth the wavelength of light in the medium of interest (col 10/ lines 1-4). One-thirtieth the wavelength of visible light (approximately 400 to 700 nanometers) corresponds to

approximately 13 to 23 nanometers which is the thickness of the phase (z direction). Applicants respectfully disagree with the Examiner that one dimension of a three-dimensional object is sufficient to specify the volume of a three dimensional object. Therefore, Allen et al. does not teach or disclose microvoids having an average volume of between 8 and 42 cubic micrometers.

The Examiner states that Allen et al. fail to disclose a particle size of between 0.30 and 1.7 micrometers, but the Examiner states that, because Allen et al. discloses a particle size one-thirtieth the wavelength of light, one skilled in the art would have arrived at Applicant's preferred range. One-thirtieth of visible ligh wavelengtht, approximately 400 to 700 nanometers, corresponds to approximately 13 to 23 nanometers, which is 13 to 130 times smaller than the claimed range of the Applicants' invention, 0.3 to 1.7 micrometers (or 300 to 1,700 nanometers). Applicants respectfully disagree that one skilled in the art would have determined the claimed range from the Allen at al. disclosure.

In view of the foregoing amendments and remarks, it is respectfully requested that the rejections under 35 USC 103 be reconsidered and withdrawn and that a Notice of Allowance be issued in this application.

Respectfully submitted,

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